

Defining the problem

client: REDACTED

advisor: Bill MacKenty (ASW IB Computer Science teacher)

COMPANY NAME software developed by my father and his team which aims to help the disabled people living in the so called locked-in state, which is when a patient is aware but unable to communicate or move due to a paralysis of a substantial part of his muscles. The system's goal is to provide these people with a way of communicating with the outside world as well as perform basic tasks, i.a. turning on the radio without the help of a caregiver. It does so by allowing for the use of assistive technologies, such as switches, eye-trackers or BCI (Brain Computer Interface) as input devices and providing them with access to email, blogs, multimedia, etc. (PISAK). Recently one of the disabled users had contacted the team regarding a usability issue, specifically a learnability problem. The user had troubles with transitioning from the old school, analogue spelling board to eviacam (which is a webcam-based facial mouse emulator that tracks the movement of the user's head to control the pointer).

One of the programmers, NAME HERE , suggested to create a learning tool in the form of a simple game, which would allow the users to get used to working with eviacam.

MY CLIENT asked me to provide an IT solution to this problem. He wants the solution to be fun and playable, user-friendly, and able to run on the newest version of the Linux Ubuntu operating system.

Word Count - 317

Rationale for the proposed solution

As a solution, I proposed a simple space shooter game that would not only help the user get used to the new hardware quickly, but also enjoy himself at the same time. The possibilities are very limited since the sole mechanic that can be used in the game is the cursor movement, due to the limitations of eviacam. Having the user hover their cursor over a target solves that problem. Additionally, user friendly graphics and animations all in the Star Wars theme will make the game more fun and enjoyable. The game is very simple and easy to play, because its aim is to make it playable with the use of assistive hardware as input, which is naturally much harder to operate than a common mouse.

I decided to develop the project in Pygame, which is a set of modules designed for writing video games in Python. I chose Pygame because it allows for a high level of complexity and control over the program, without having to worry about the low-level game mechanics such as rendering or configuring input. Furthermore, there are many excellent resources and documentation provided by the Pygame community, which would help me learn more about Pygame and build on my current programming skills in Python as well as learn more about the new paradigm of object oriented programming, which we will not cover in class. As I already have some game creation experience in Pygame, it will allow me to develop a complex program as opposed to learning about a new environment from scratch and creating a low

level product as a result. It is also worth noting that Pygame is very accessible, as it is a multi-platform, Open Source module. Thus the program can be installed on many different operating systems for free.

I believe that a fun, playable game is a perfect tool for helping users get used to new technologies, as it allows them to get used to using them while allowing them to have fun at the same time. This idea was used by Microsoft with the launch of their first products in the 1990s, where they included Solitaire in their operating system in order to help new users familiarize themselves with clicking and moving the cursor. I hope that my product will be able to help disabled people speed up the tedious and often very frustrating process of learning how to make use of the tools that they are provided, and as a result help them quickly obtain the same level of technological independence as we have, that is being able to effortlessly and easily operate their computers without the help of a caregiver.

Word Count - 443

Stating success criteria

- ❑ Upon startup a song will start playing and the name of the game will be displayed for a short period of time before the main menu appears.
- ❑ The main menu will show instructions for how to play and start the game.
- ❑ When in game, the user will be able to pause and quit the game, as well as switch between fullscreen and windowed mode.
- ❑ When paused, the game will freeze and text indicating that the game is paused together with instructions for how to unpause or quit the game will appear over the frozen frame.
- ❑ A crosshair will be controlled with the mouse input and will always follow the movements of the cursor.
- ❑ At the bottom of the screen, a spaceship will follow the x-coordinate of the cursor
- ❑ Asteroids of different shapes and sizes will fall from the top of the screen with randomly assigned directions, movement speeds and rotation speeds.
- ❑ When the crosshair will hover over an asteroid, it will change color and size, indicating that it is locked on a target. The spaceship will then fire laser bullets that will travel upwards at a constant speed.
- ❑ The bullets will be fired at a set frequency, each fire accompanied by a sound.
- ❑ When one of the bullets hits an asteroid, both objects will disappear and an explosion animation will appear in their place, accompanied by an explosion sound.
- ❑ The game will keep track of the score value, that will be incremented by 1 every time an asteroid is shot down. The score will be displayed in the top left corner of the screen.
- ❑ The game will also keep track of the top score which will be displayed alongside the current score in the top left corner of the screen.
- ❑ When an asteroid is shot down or falls out of the screen, it disappears and a new one is created in its place.
- ❑ Over time more and more asteroids appear, making the game harder as it progresses.
- ❑ When one of the asteroids hits the spaceship, both objects will disappear and an explosion animation will appear in their place, accompanied by an explosion sound. Then the game will return to the main menu, from which the user will be able to quit or start a new game.
- ❑ The song will start playing from the beginning when it ends.
- ❑ The game will be playable with the use of eviacam.